COMMON INJURIES OF THE SHOULDER & ELBOW

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Outline

- Shoulder
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  - Physical Exam
  - Common Injuries
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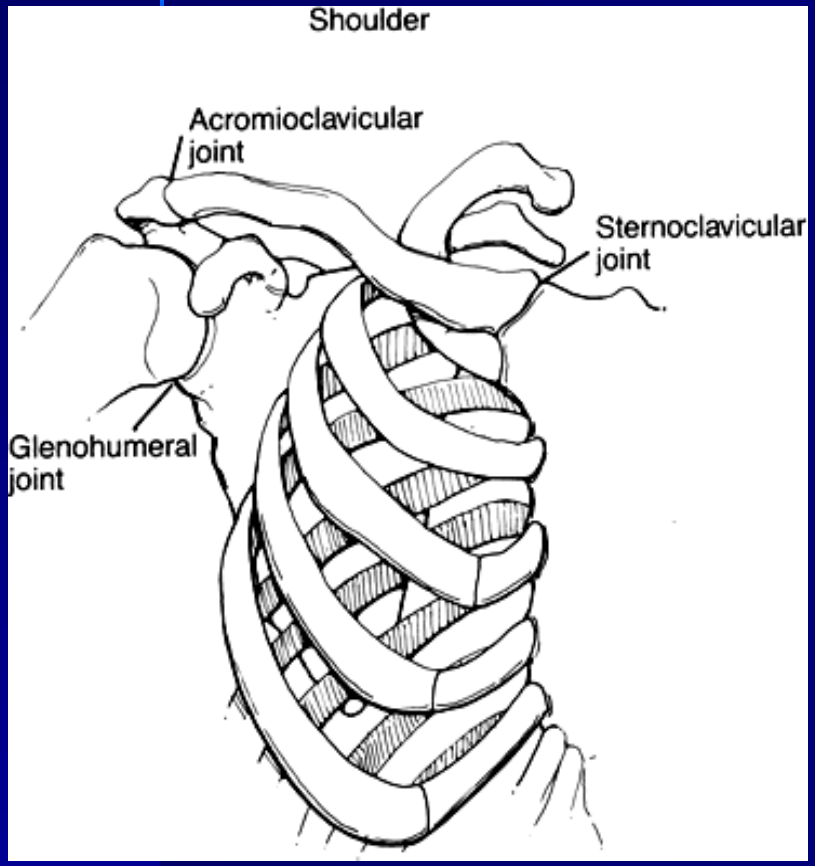
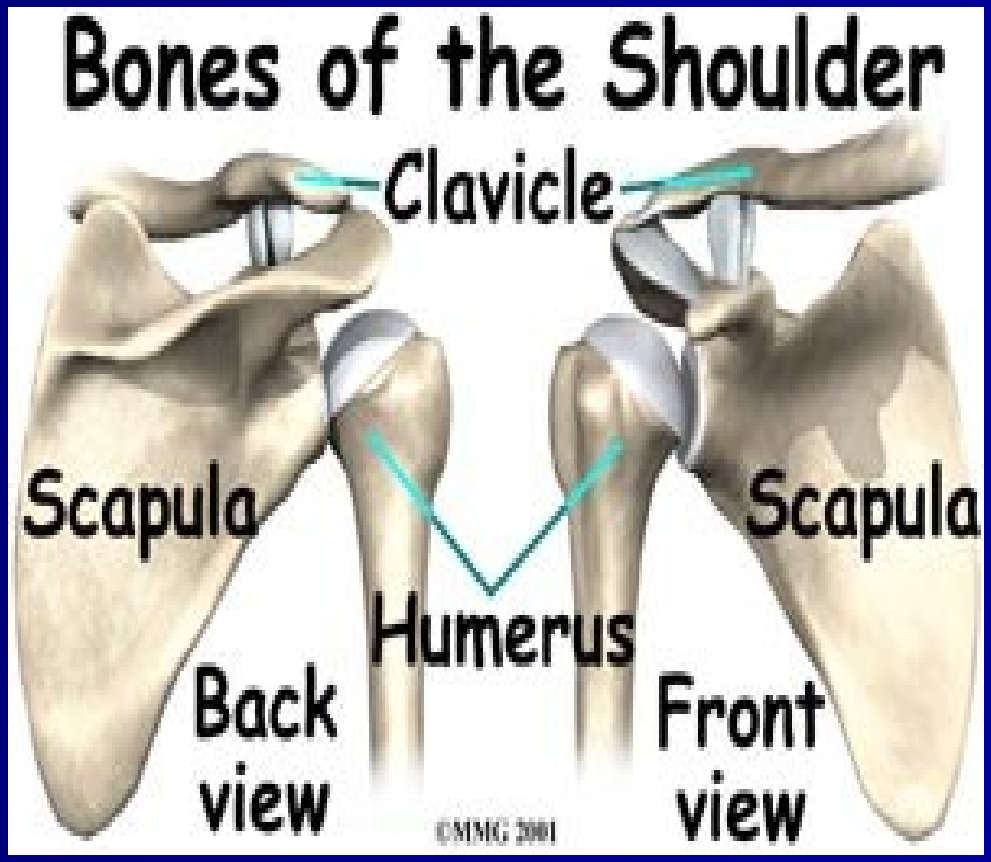
    - Impingement
    - Rotator Cuff Tear
    - Biceps Tendonitis
    - AC Joint Separation
    - Adhesive Capsulitis
    - Labral Tears
- Elbow
  - Joint Anatomy
  - Common Injuries
    - Olecranon Bursitis
    - Lateral Epicondylitis
    - Medial Epicondylitis
    - Ulnar Collateral Ligament Tear

Shoulder Anatomy: Bones and Musculature

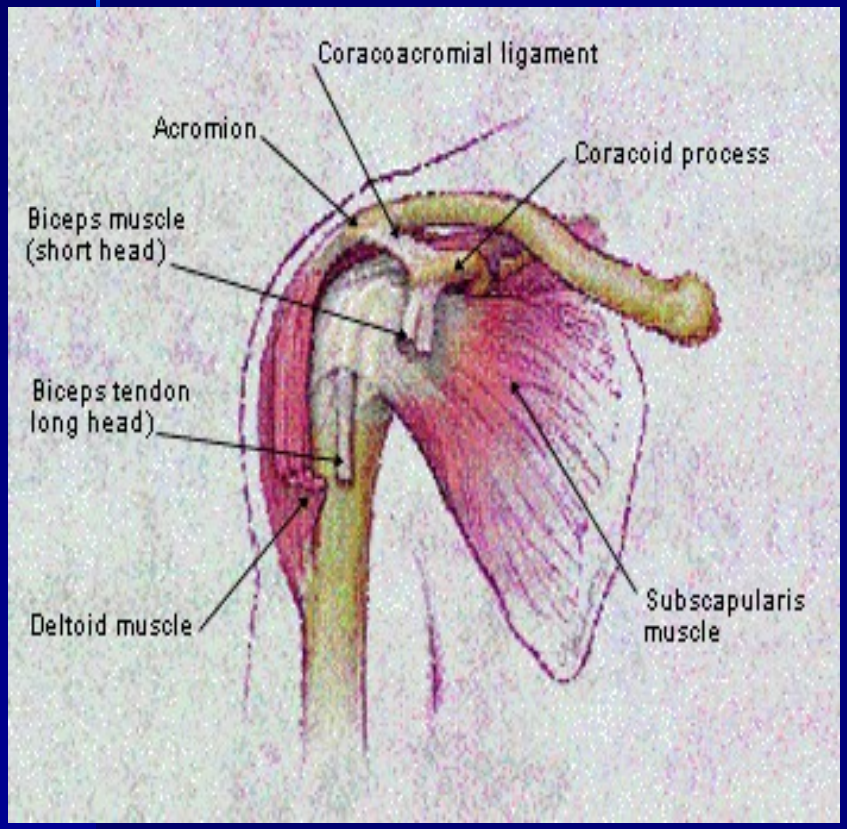


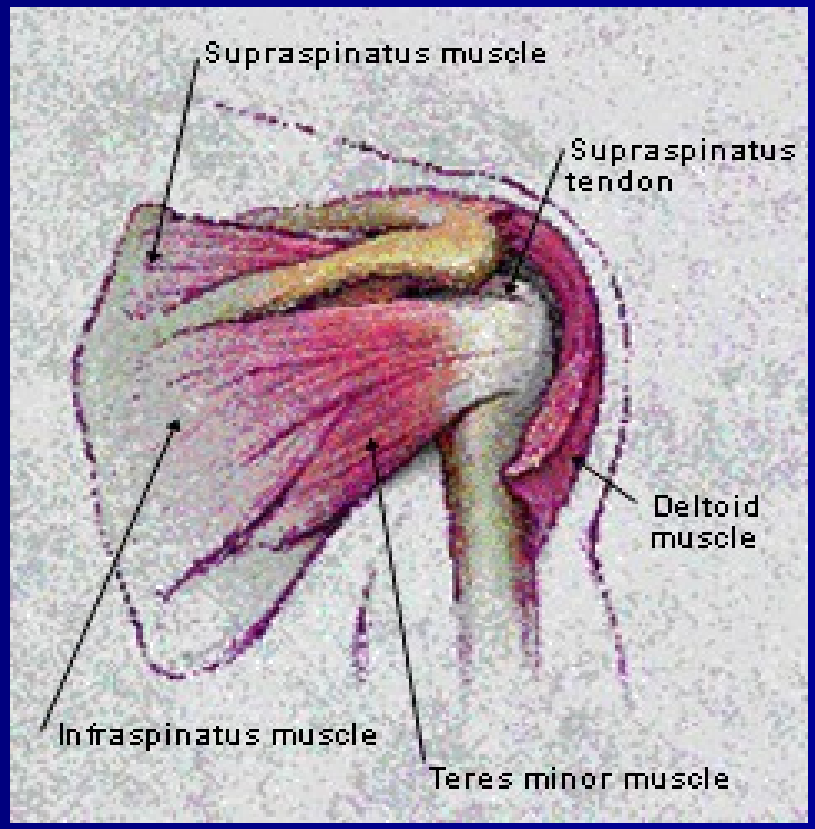


Shoulder Anatomy: Bones and Musculature

- Anterior thoracoappendicular
  - Pectoralis Major
  - Pectoralis Minor
  - Subclavius
  - Serratus Anterior
- Superficial posterior thoracoappendicular
  - Trapezius
  - Lattisimus Dorsi
- Deep posterior thoracoappendicular
  - Levator scapulae
  - Rhomboids
- Scapulohumeral
  - Deltoid
  - Teres Major
  - Rotator Cuff Muscles

Shoulder Anatomy: Bones and Musculature

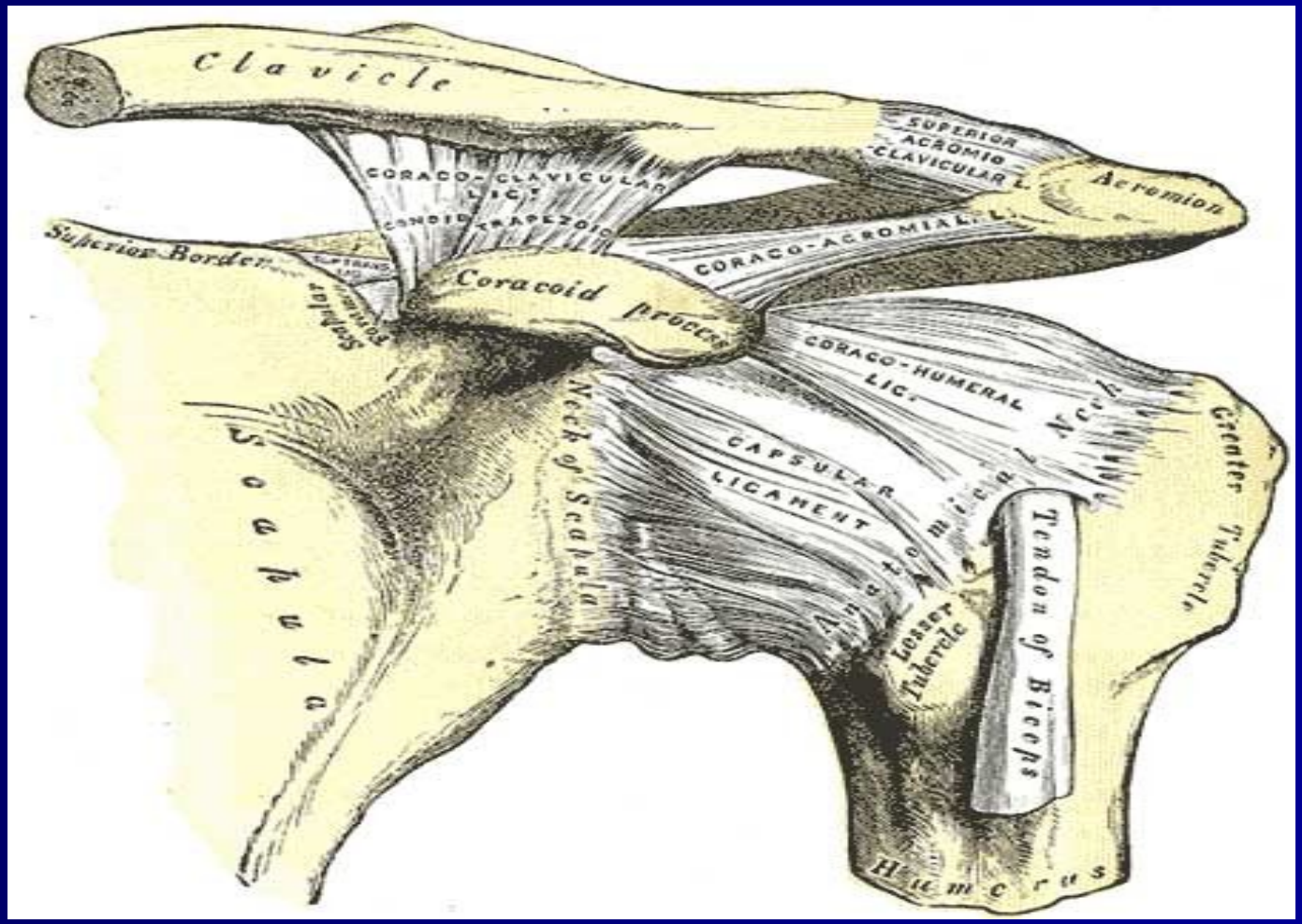




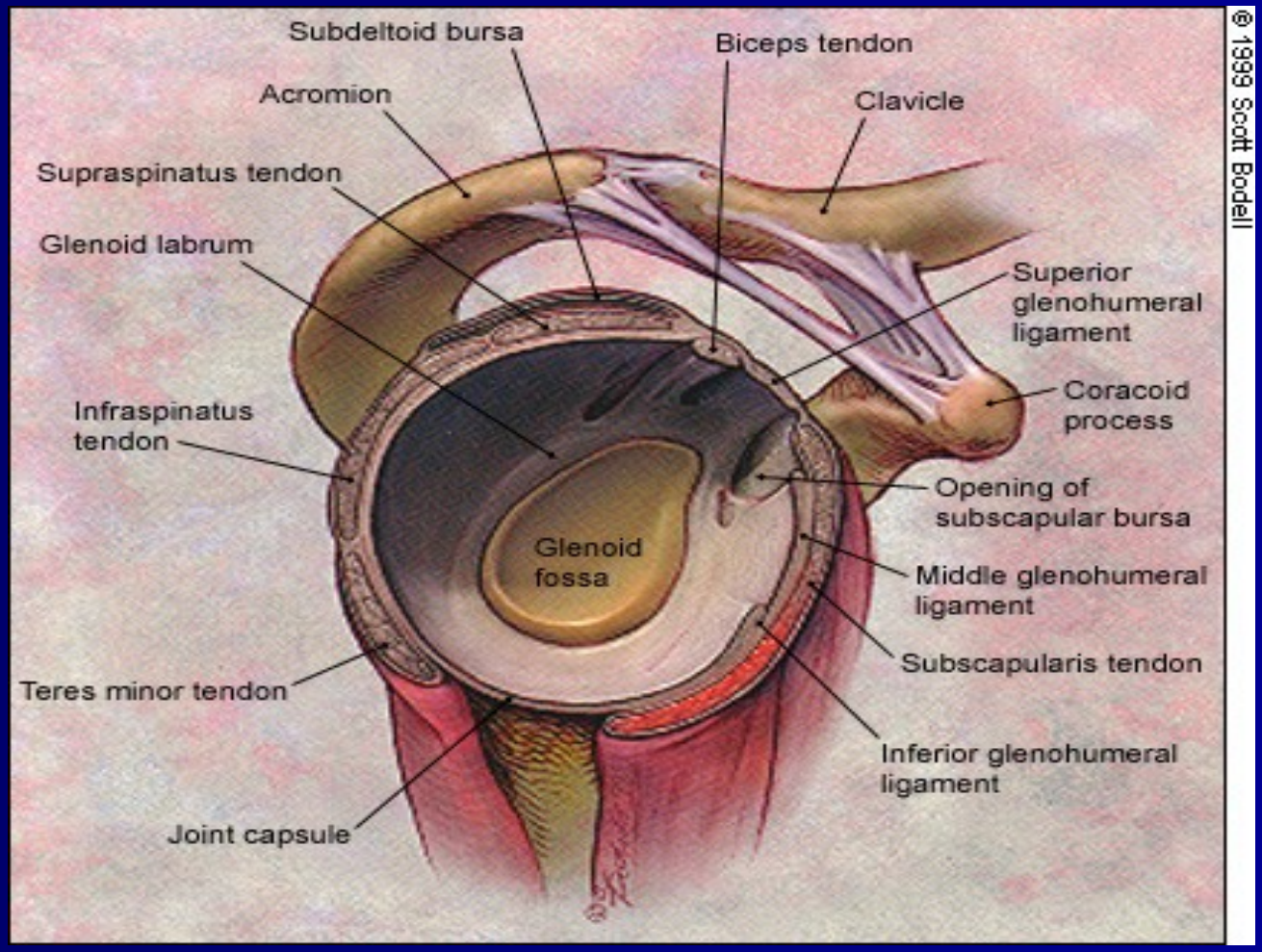
Joints and Joint Movements

- Acromioclavicular
- Glenohumeral
- Sternoclavicular
- Scapulothoracic
  - Scapula is suspended on rib cage and is highly mobile
  - Movements here increase ROM of joint
  - Not a “true” joint

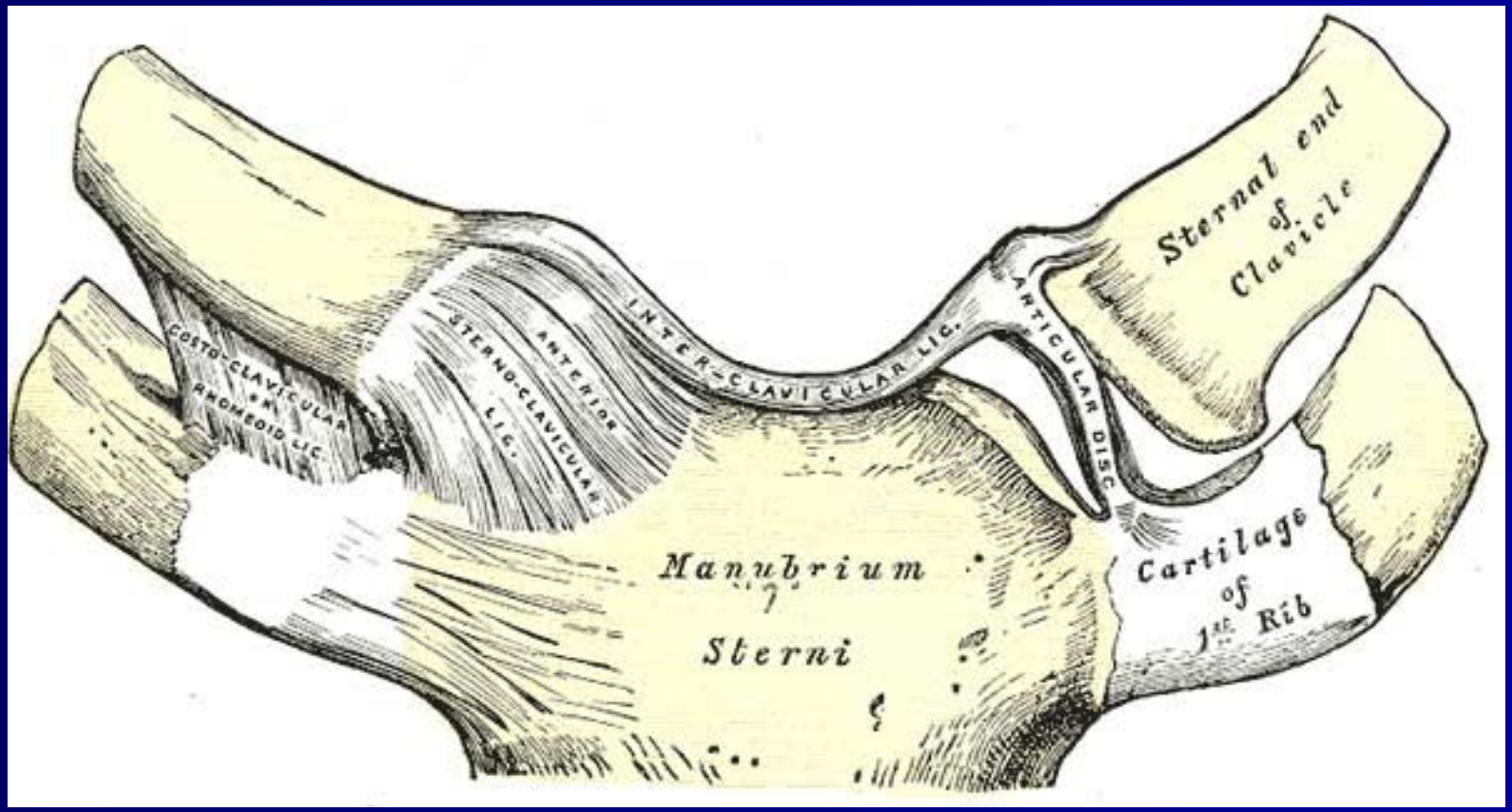
Joints and Joint Movements



Joints and Joint Movements



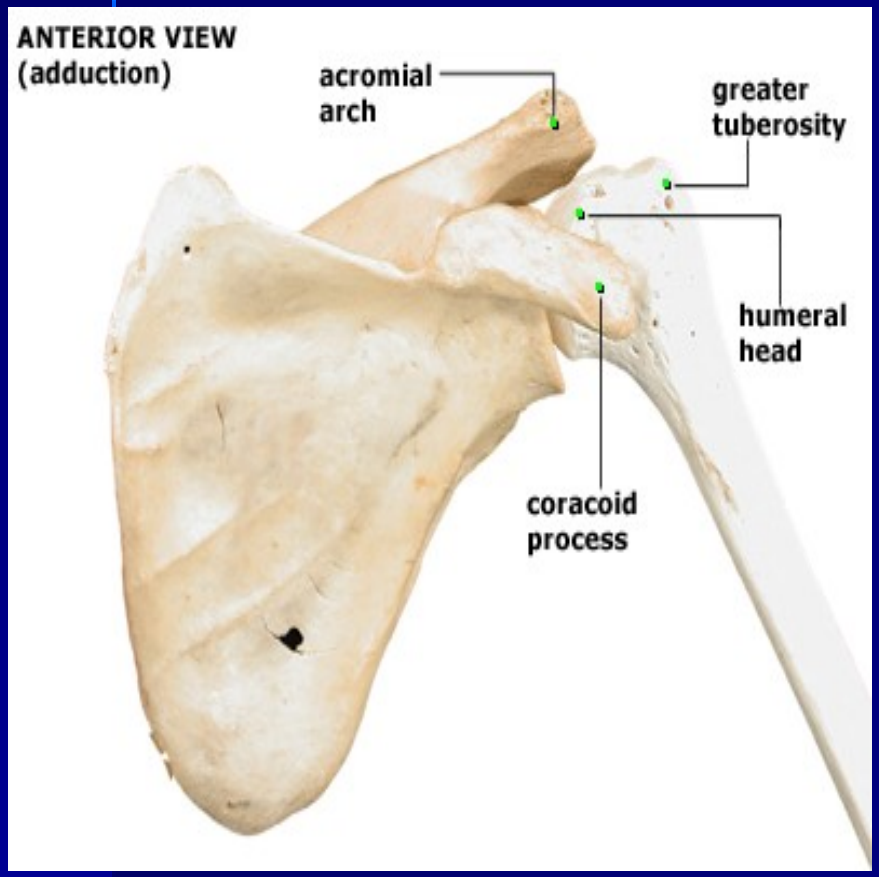
Joints and Joint Movements

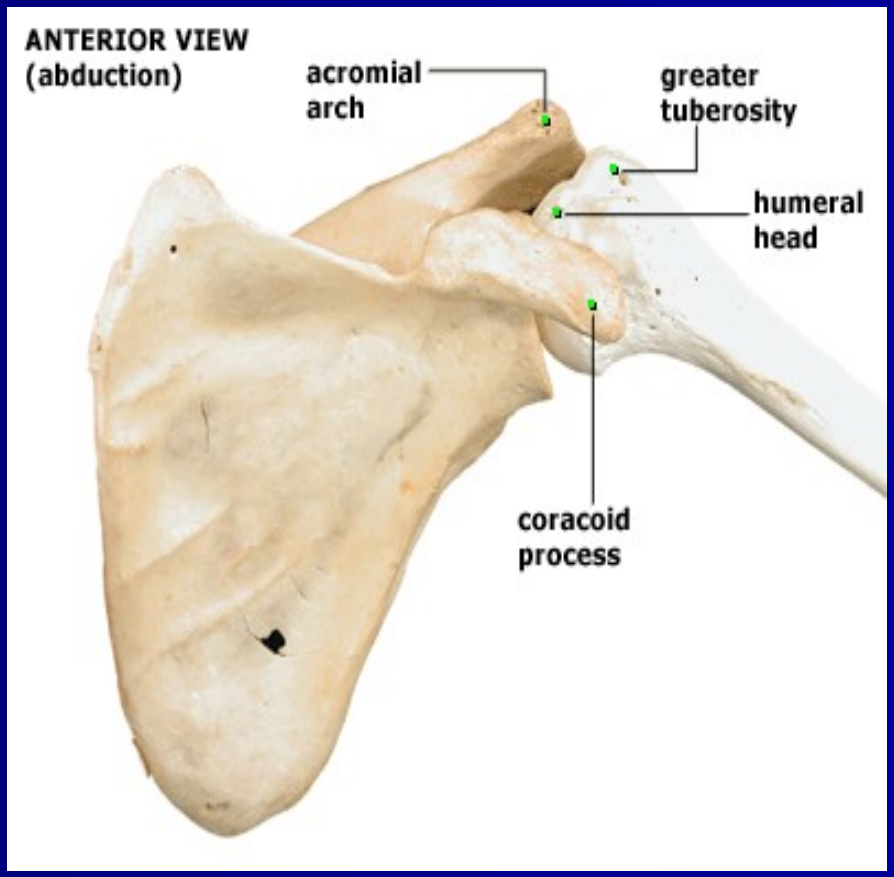


Joints and Joint Movements

- Acromioclavicular Joint: Rotation
- Sternoclavicular Joint: Anterior, Posterior, Inferior
- Glenohumeral Joint
  - Movements
    - Flexion-extension
    - Abduction-Adduction
    - Rotation
    - Circumduction
  - Muscular control
    - Flexion: Pectoralis Major, Deltoid (Anterior), Coracobrachialis
    - Extension: Deltoid (Posterior), Teres Major
    - Abduction: Deltoid, Supraspinatus
    - Adduction: Pectoralis Major, Latissimus, Subscapularis, Infrapspinatus, Teres Minor
    - Medial Rotation: Subscapularis, Pectoralis Major, Deltoid (A), Latissimus
    - Lateral Rotation: Infraspinatus, Teres Minor, Deltoid

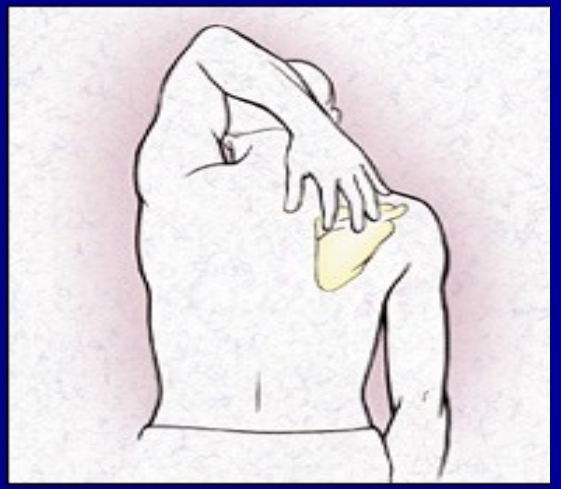
Joints and Joint Movements

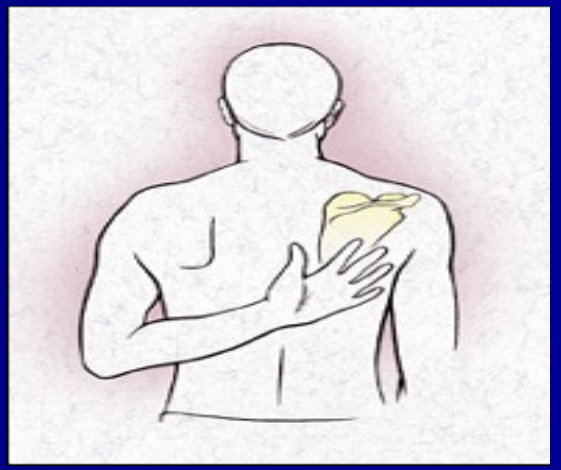




Shoulder: Physical Exam

- Inspection:
  - Bilateral inspection
  - Observe for asymmetry, atrophy, swelling, etc
- Palpation:
  - AC, SC, GH joints
  - Cervical spine
  - Coracoid Process
  - Biceps Tendon
- Range of Motion:
  - Active/Passive
  - Apley Scratch Test
  - Compare affected/unaffected sides
- Neurological Exam
- Special Tests





Shoulder ROM

- Abduction: 180 degrees
- Adduction: 30-45 degrees
- Forward flexion/elevation: 180 degrees
- Extension: 60 degrees
- Internal Rotation: 70 degrees
- External Rotation: 90 degrees

Common Shoulder Injuries

Glenohumeral Instability

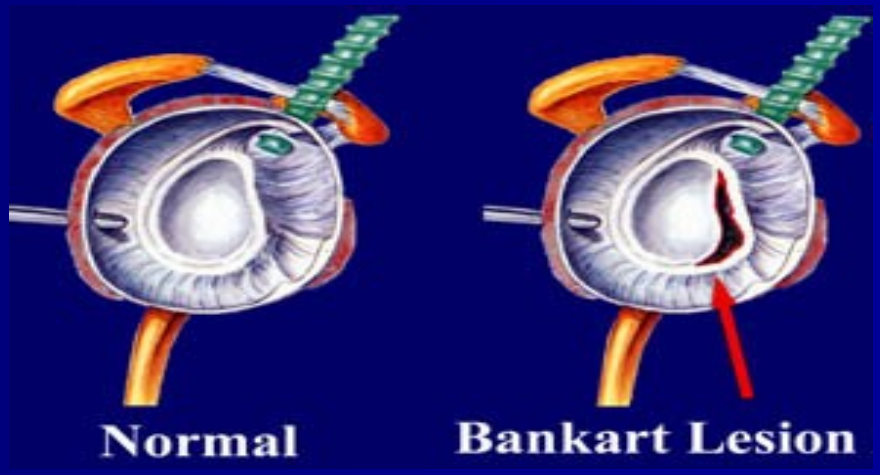
- Static and Dynamic Stabilization
- Degree: Dislocation, Subluxation, Microinstability
- Frequency: Acute vs. Chronic
- Direction: Unidirectional vs. Multidirectional
- Etiology: Traumatic vs. Atraumatic

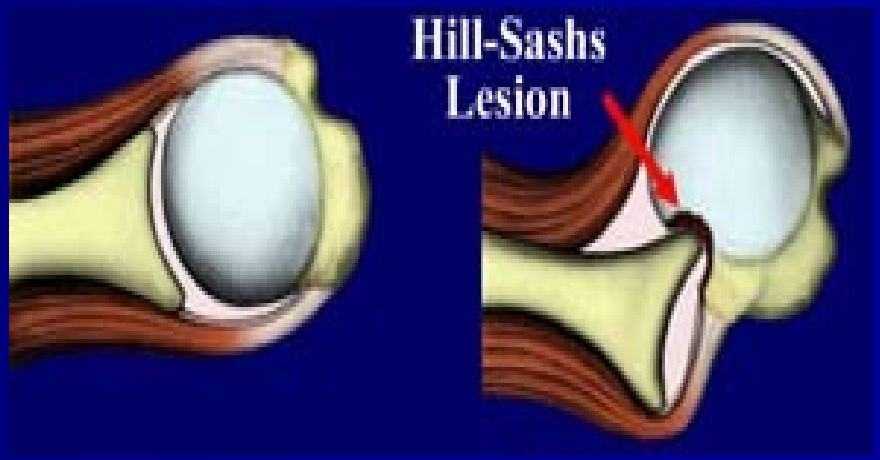
Glenohumeral Instability

- Anterior Dislocation
  - Fall on outstretched, externally rotated, abducted arm
  - Bankart, Hill-Sachs Lesions
  - Exam: Painful internal rotation/adduction, palapable humeral head
  - Special Tests: Apprehension, Relocation, Anterior Release

Glenohumeral Instability

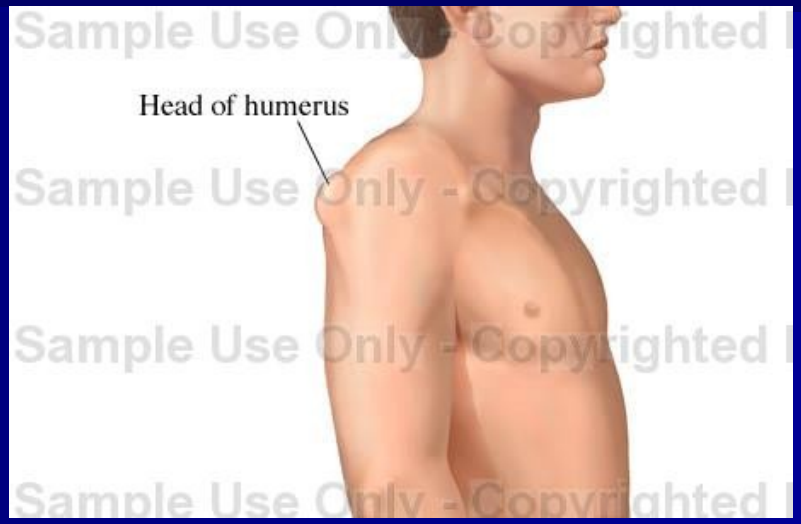
- Bankart Lesion
  - IGHL torn
  - Anteroinferior labrum torn
  - Recurrent dislocations
- Hill-Sachs Lesion
  - Humeral compression fracture





Glenohumeral Instability

- Posterior Dislocations
  - Electrocutions, Seizures
  - Severe internal rotation, adduction
  - Exam: Pain on external rotation, Posterior apprehension test

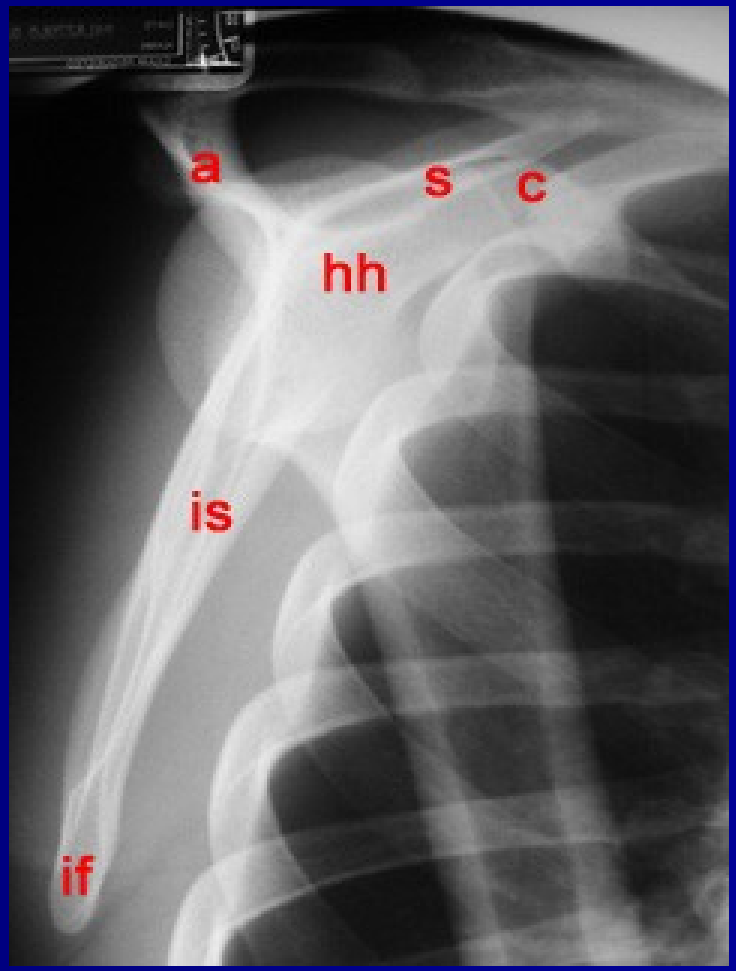


Glenohumeral Instability

- Multidirectional Instability
  - Increased joint laxity
  - Atraumatic, multiple injuries
  - Pain, shoulder “looseness”
  - Instability in more than one direction
  - Positive Sulcus sign

Glenohumeral Instability

- Diagnosis
  - Physical Exam
  - Radiographs: AP, axillary, scapular "Y" view
  - CT, MRI

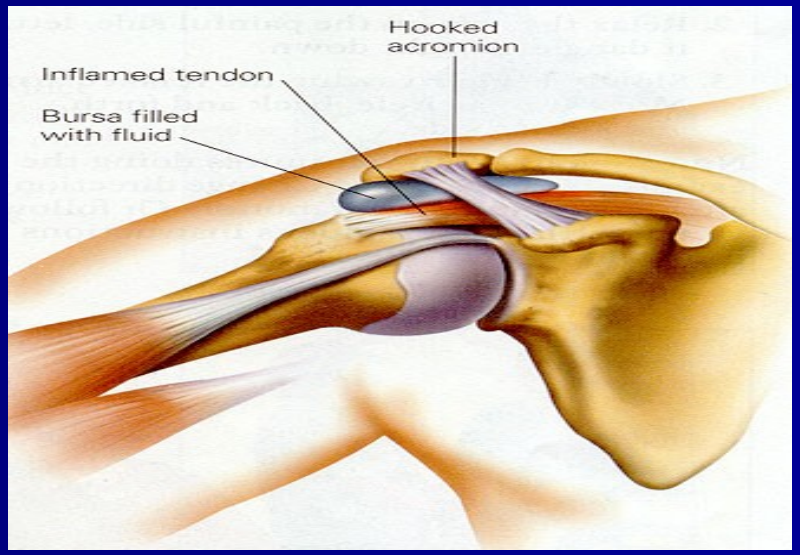


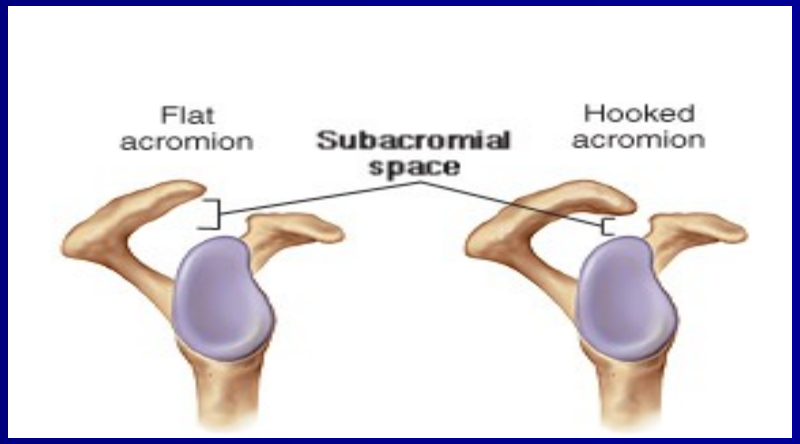
Glenohumeral Instability

- Treatment
  - Traumatic: Closed Reduction
  - Analgesics
  - Rehabilitation
    - Initial Phase
    - Recovery Phase
    - Functional Phase
  - Surgery

Impingement

- Definition: Extrinsic compression of the rotator cuff in the supraspinatus outlet space
- Symptoms:
  - Pain with Overhead position
  - Anterior, lateral shoulder pain
  - Flexion, Internal Rotation
  - Night Pain
- Risk Factors:
  - Overhead activities
  - Micotrauma
  - GH Instability
  - Shape of Acromion
  - DJD





Impingement

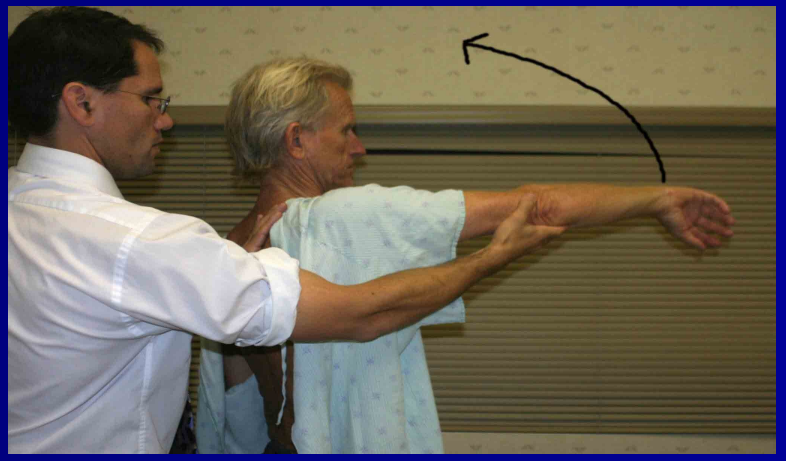
- Neer's Stages of Impingement
  - Stage I:
    - Inflammation, Edema, Hemorrhage
    - <25 years old
  - Stage II:
    - Fibrosis and Tendonitis
    - 25-40 years old
  - Stage III
    - Osteophytes and Tendon Rupture
    - > 40 years old

Impingement

- Physical Exam
  - Inspection
  - Palpation
  - ROM
  - Neurologic Exam
  - Evaluate for instability, Biceps tendonitis
  - Special Tests: Neer's, Hawkins', Drop Arm, Empty Can

Impingement

- Neer's: Internal Rotation, Elevation
- Hawkins: Shoulder and Elbow Flexion, Internal Rotation
- Subacromial Injection Test: Inject Lidocaine, repeat Impingement tests



Impingement

- Drop Arm Test: Slowly lower arm from full abduction
- Empty Can Test: Resistance applied in forward flexion and abduction

Impingement

- Diagnosis
  - Physical Exam
  - Radiographs: AP, axillary, scapular outlet
  - MRI

Impingement: Treatment

- Acute Phase:
  - Avoid Exacerbating Factors
  - Control Pain/Inflammation
  - Physical Therapy
  - Corticosteroid Injection
- Recovery Phase: ROM, Strength, Proprioception
- Maintenance Phase: Longer, Intense Workouts
- Surgical Intervention: Failed Conservative Measures, Signifcant Disability

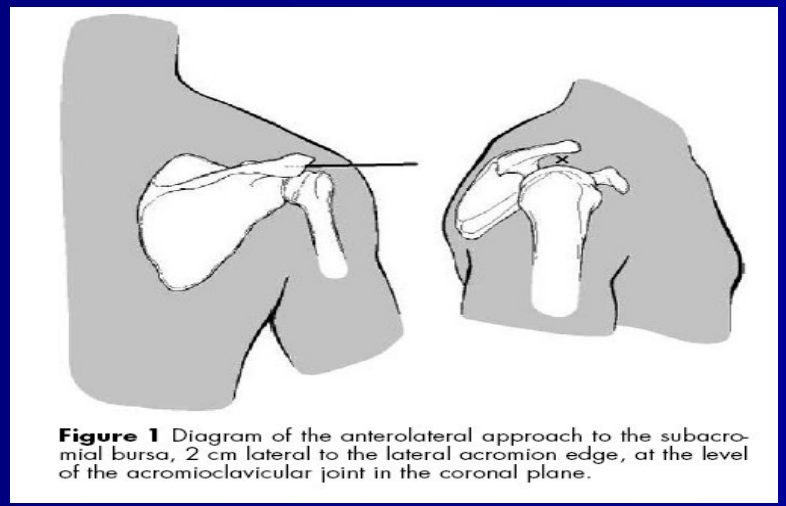
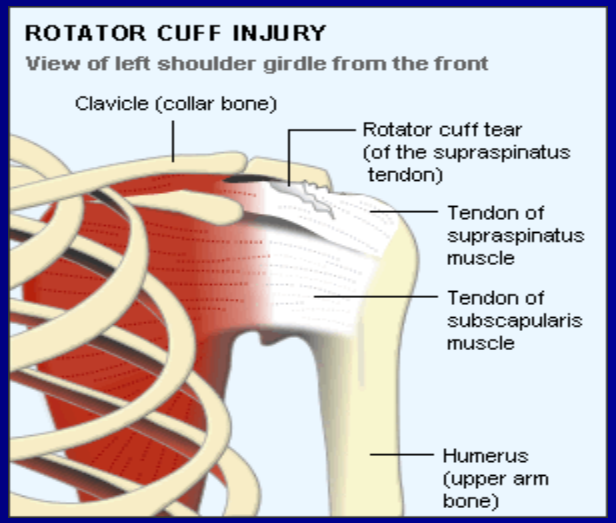


Figure 1 Diagram of the anterolateral approach to the subacromial bursa, 2 cm lateral to the lateral acromion edge, at the level of the acromioclavicular joint in the coronal plane.

Rotator Cuff Tears

- Similar Presentation as Impingement
- Chronic damage to “hypovascular zone”
- Weakness after “Injection Test”
- Physical Exam, Plain Film, MRI, Arthrogram

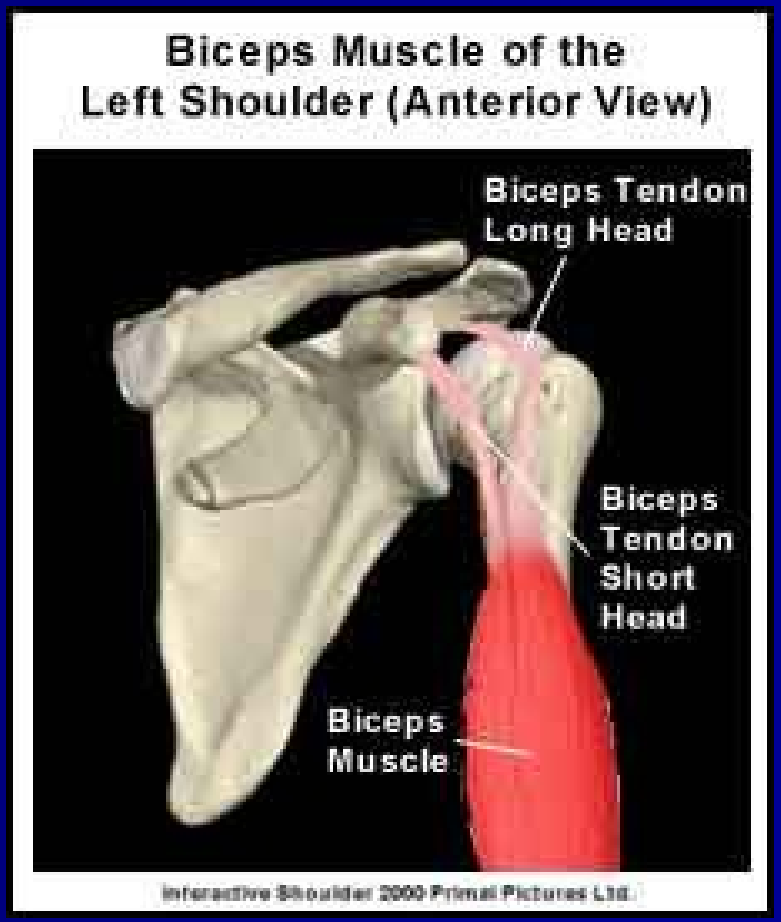


Rotator Cuff Tears

- Treatment
  - Conservative: Similar to Impingement
  - Surgical:
    - Young patient, large tears, dominant arm
    - Failed Conservative Therapy
    - High-Level Athlete
    - Unable to perform vocational activities
    - Repair, Decompression, Debridement, Arthroplasty
    - Success depends upon degree of tendon damage and degeneration

Biceps Tendonitis

- Definition: Inflammation of long head of Biceps
- Risk factors: Chronic overuse, RTC pathology, GH Instability, OA
- History: Anterior Shoulder pain
- Physical: Bicipital Groove Tenderness, Speed's, Yergason's



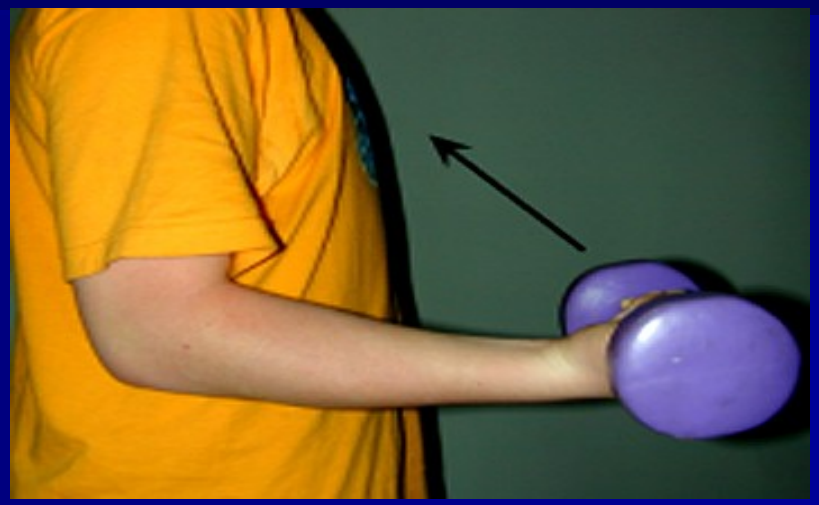
Biceps Tendonitis

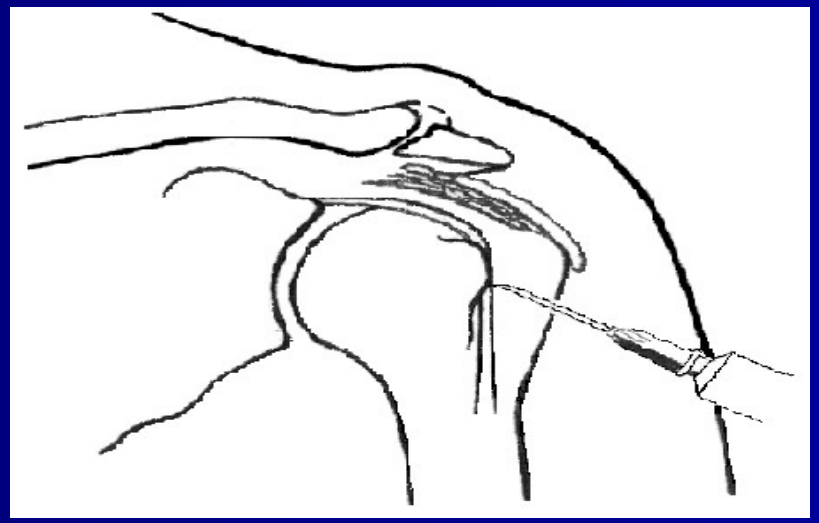
- Speed's Test: Resistance against Shoulder Flexion

- Yergason's Test: Resistance against Supination

Biceps Tendonitis

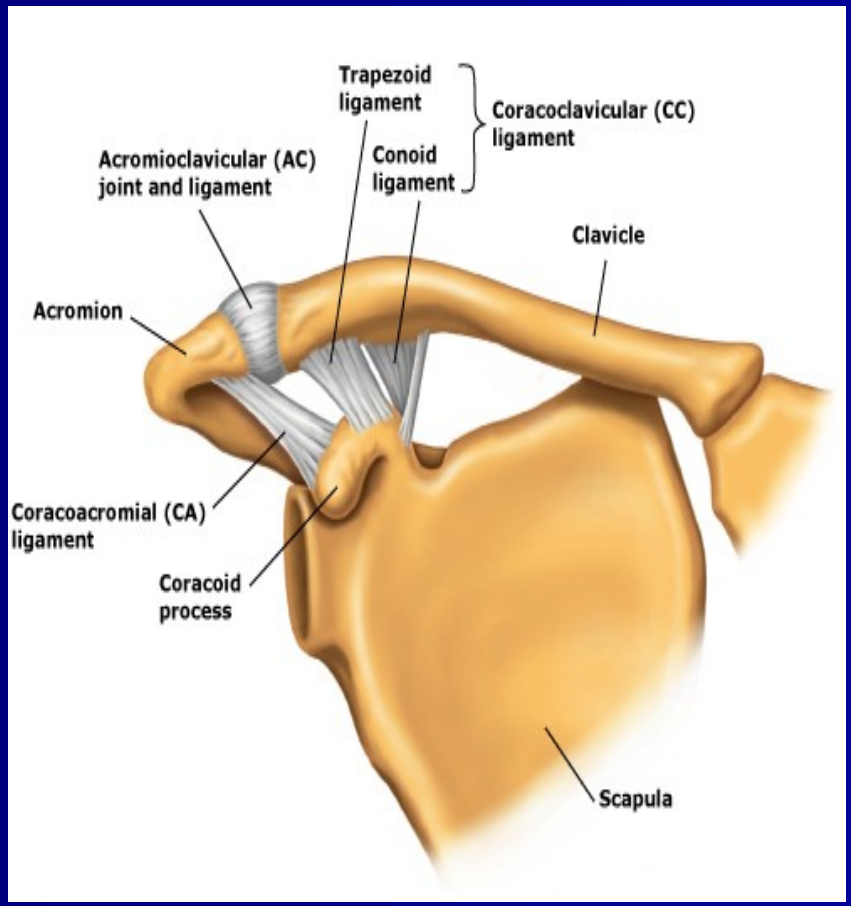
- Treatment:
  - Similar to Impingement
  - Corticosteroid Injection
  - Surgical Referral





AC Joint Separation

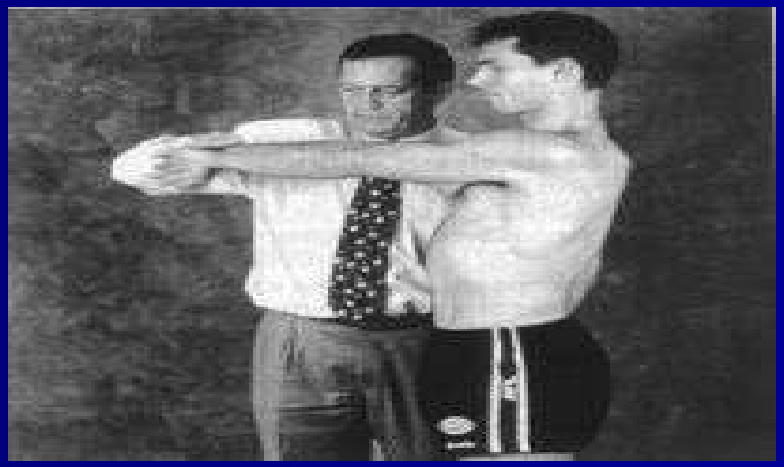
- Mechanism: Fall on Acromion
- Presentation: Anterior Shoulder pain, deformity
- Physical: Pain, Swelling, Deformity, Cross-Arm Test, O'Brien's Test



AC Joint Separation

- Cross Arm Test: Elevate arm, adduct across body

- O'Brien Test
  - Arm Flexed
  - Adducted, Internally Rotated (Thumb Down)
  - Downward Resistance applied, repeated with arm supinated



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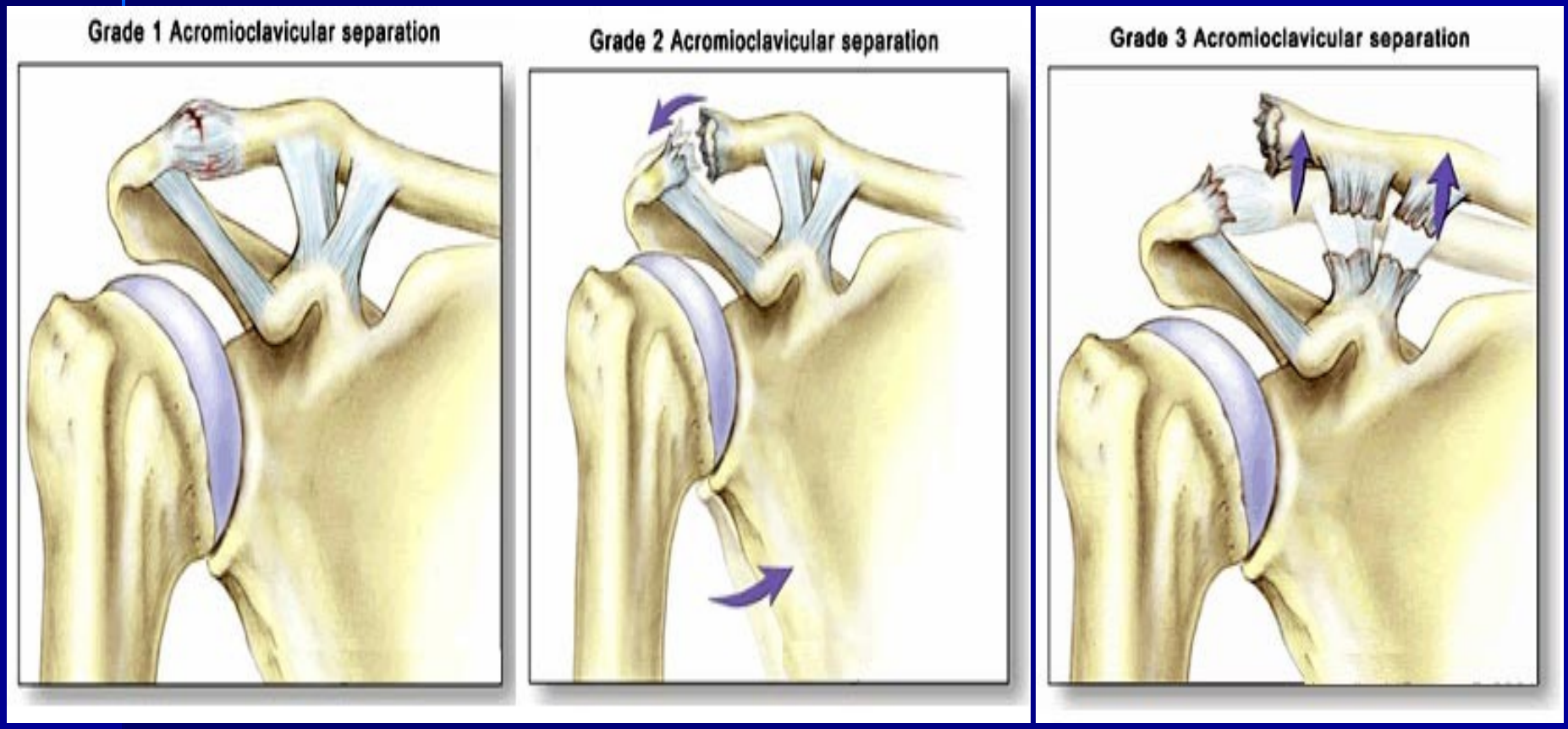

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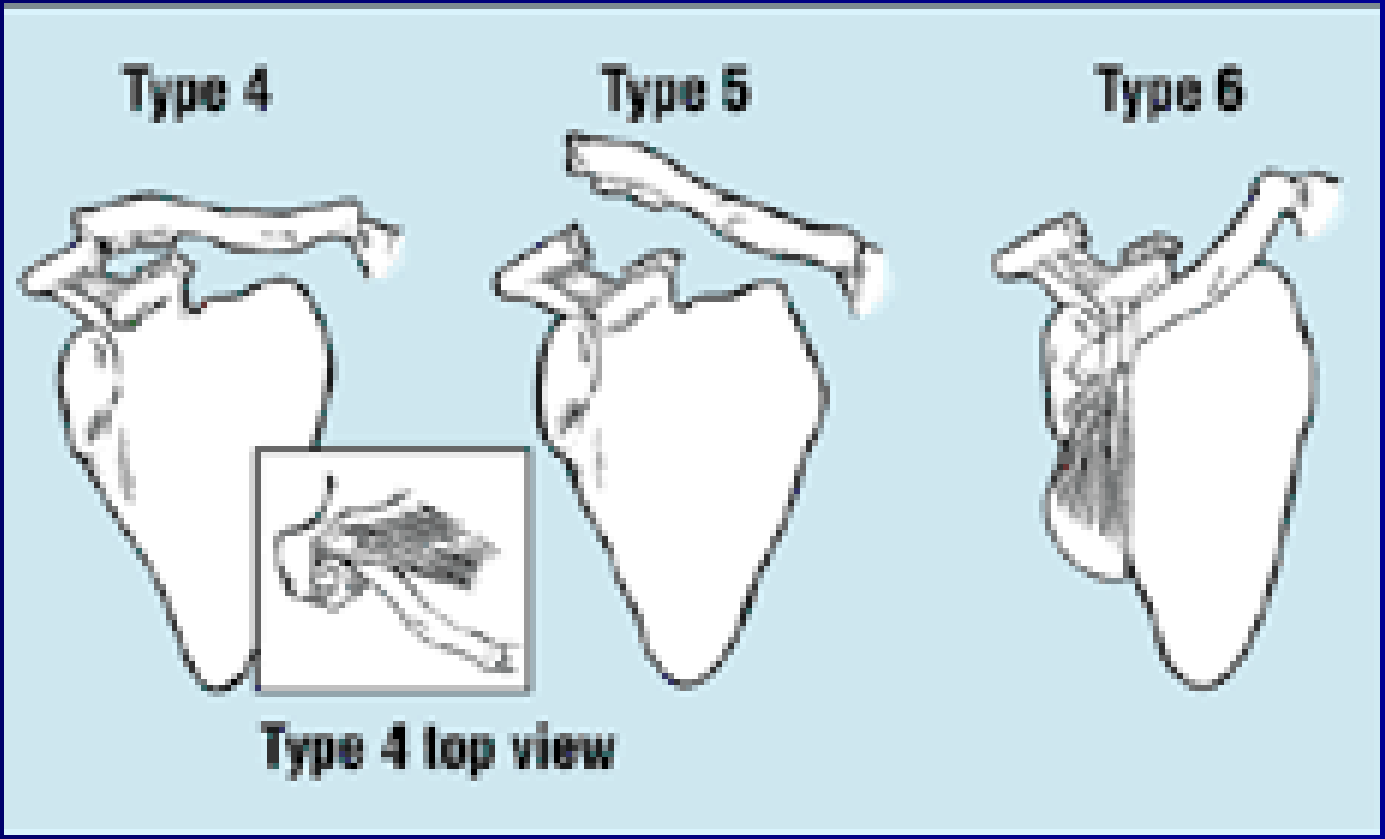
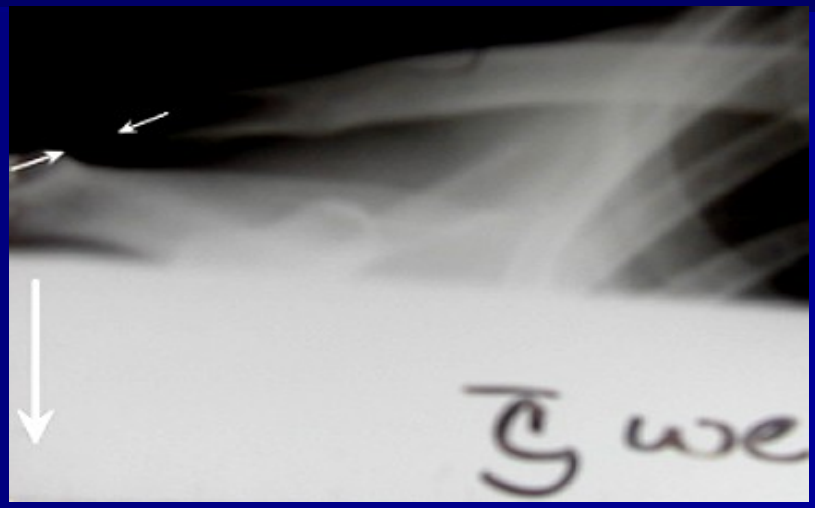


AC Joint Separation

- Imaging
  - Bilateral AP
  - Zanca View
    - 10-15 degrees of cephalic tilt
    - Eliminates overlying structures
  - Axillary View
    - Evaluates clavicular displacement
  - Stress View
    - 10-15 lb weights attached to wrist
    - Tests CC ligament



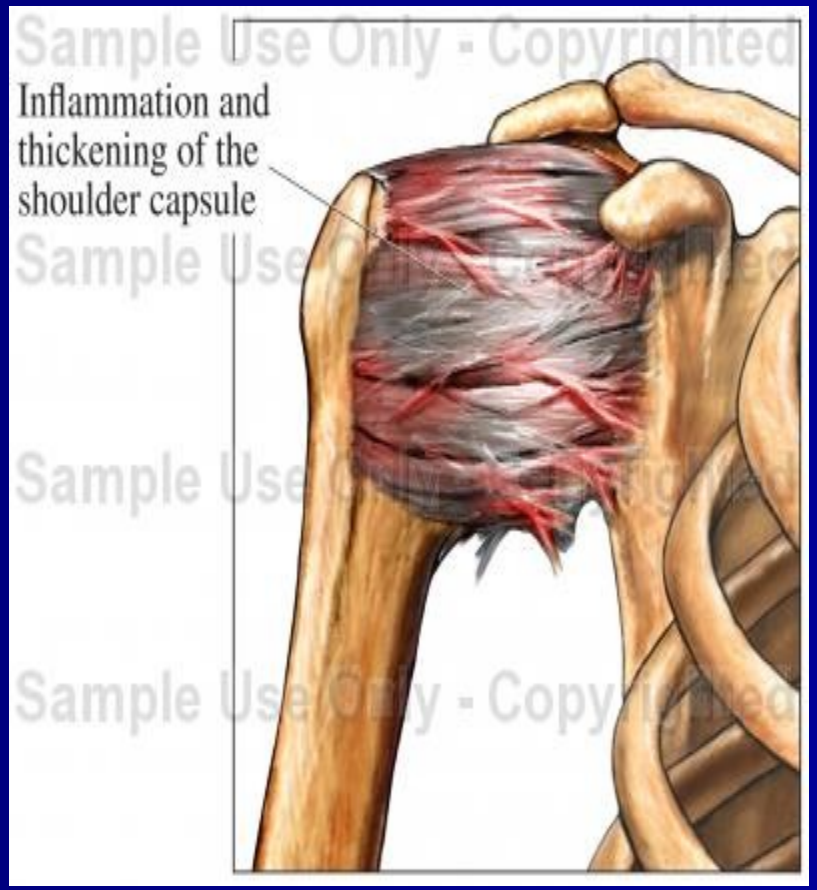
AC Joint Separation: Treatment

- Grade I and II: Conservative
  - Immobilization
  - Ice, Analgesics
  - ROM, Strengthening
  - Corticosteroid Injection
- Grade III: Controversial
  - Immobilization for up to 4 weeks
  - Most studies indicate conservative treatment is better
  - Surgical management with higher rate of complications[1]
  - Conservative management with mean time of 2.1 weeks to return to work[2]
- Grade IV-VI: Surgical

1. Taft TN, et al. Dislocation of the acromioclavicular joint. An end-result study. J Bone Joint Surg Am 1987 Sep;69(7):1045-51.
2. Auwojtys EM; Nelson G. Conservative treatment of Grade III acromioclavicular dislocations. SOClin Orthop Relat Res. 1991 Jul;(268):112-9.

Adhesive Capsulitis

- Painful restriction of active and passive GH ROM
- Risk Factors
  - Idiopathic
  - Diabetes Mellitus
  - Female Gender
  - Ages 40-60
  - Immobilization
  - Inflammation
  - Stroke



Adhesive Capsulitis

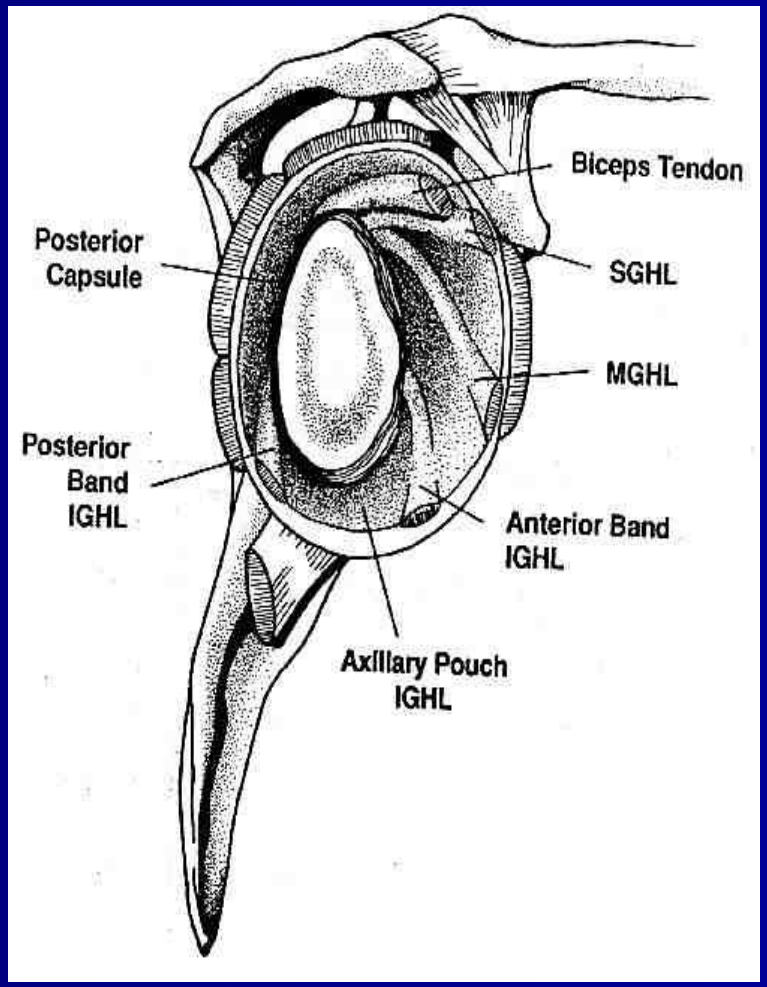
- Stage I
  - 1-3 months
  - Pain with normal ROM
- Stage II: “Freezing”
  - 3-9 months
  - Pain and progressive ROM restriction
- Stage III: “Frozen”
  - 9-15 months
  - Severe ROM restriction with decreased pain
- Stage IV: “Thawing”
  - 15-24 months
  - Progressive restoration of ROM

Adhesive Capsulitis: Treatment

- Modification
- Anti-Inflammatorie
- ROM, Stretching
- Corticosteroids
- Surgical
  - Dilatation
  - Manipulation

Labral Tears

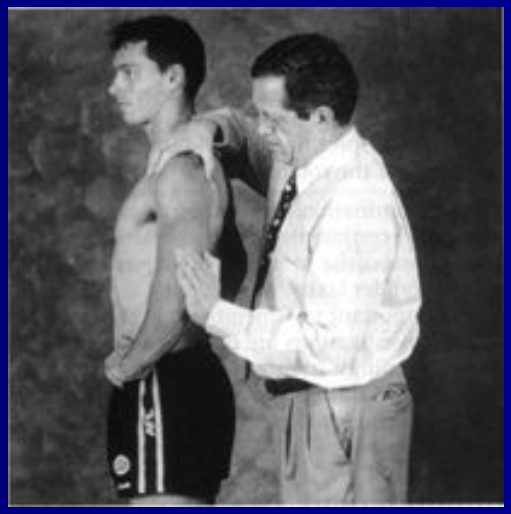
- Superior Labral Anterior to Posterior Injury (SLAP)
- Injuries to superior labrum and biceps tendon complex
- Causes: Traction Injuries, Overhead motion, Trauma



Labral Tears

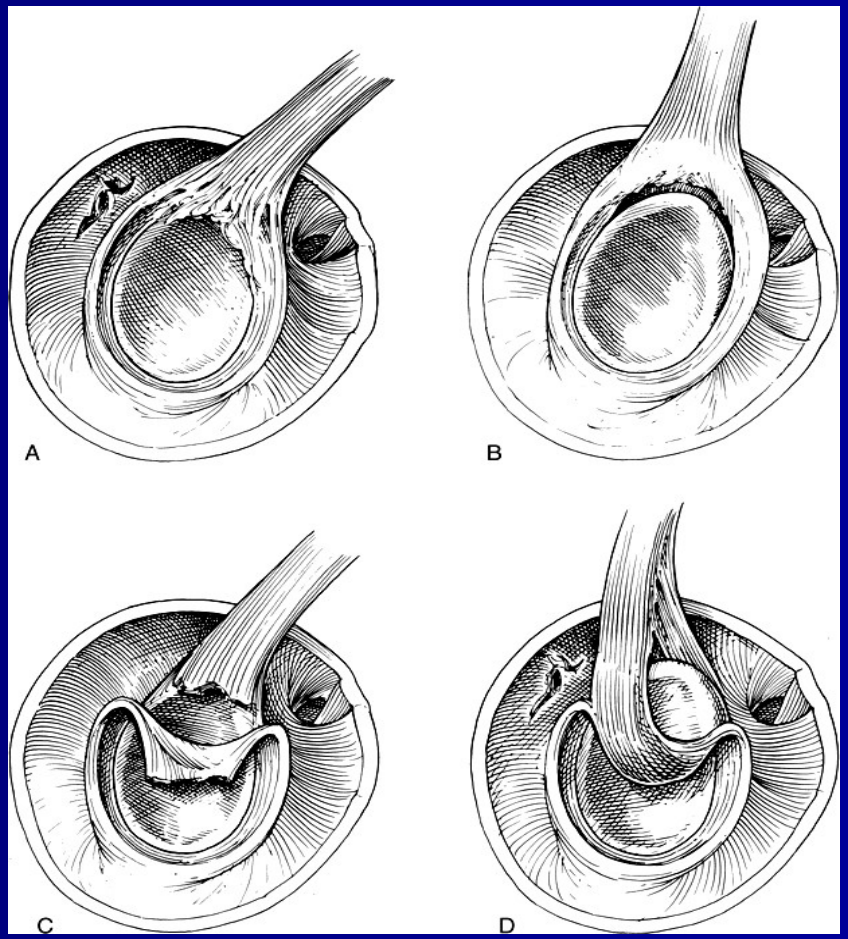
- History:
  - Pain with overhead or cross-body activity
  - Popping, clicking, catching
  - Can mimic other shoulder pathology

- Physical:
  - Biceps Load Test
  - O'Brien's Test
  - Crank Test
  - Anterior Slide Test



Labral Tears

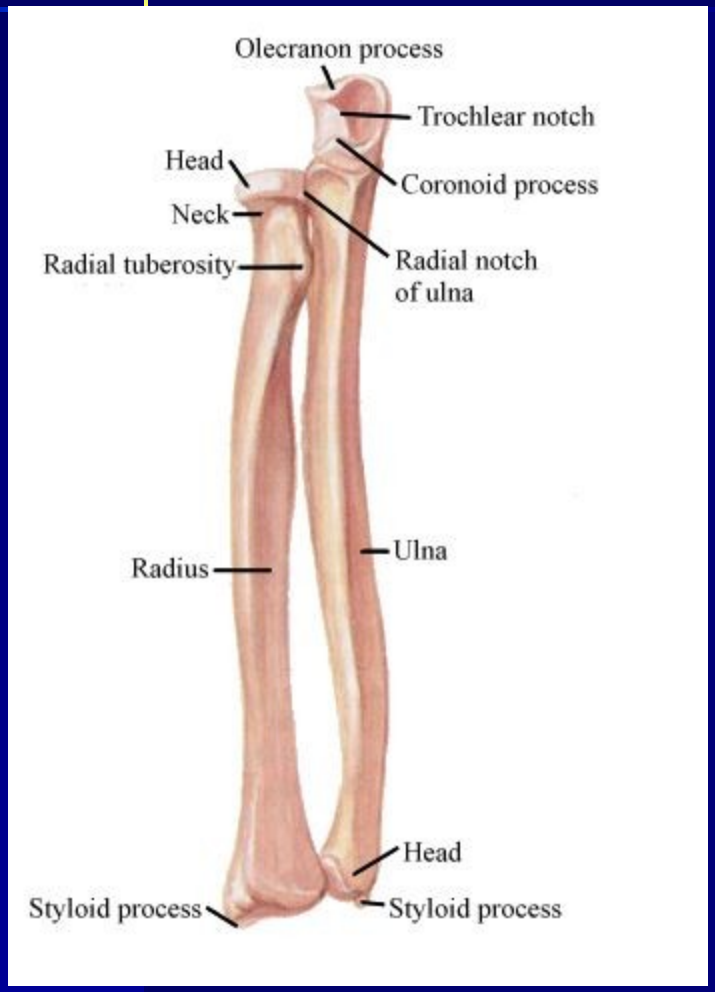
- Type 1: Fraying Injury
- Type 2: Biceps tendon detached
- Type 3: “Bucket-handle” tear
- Type 4: “Bucket-handle” with Biceps detached

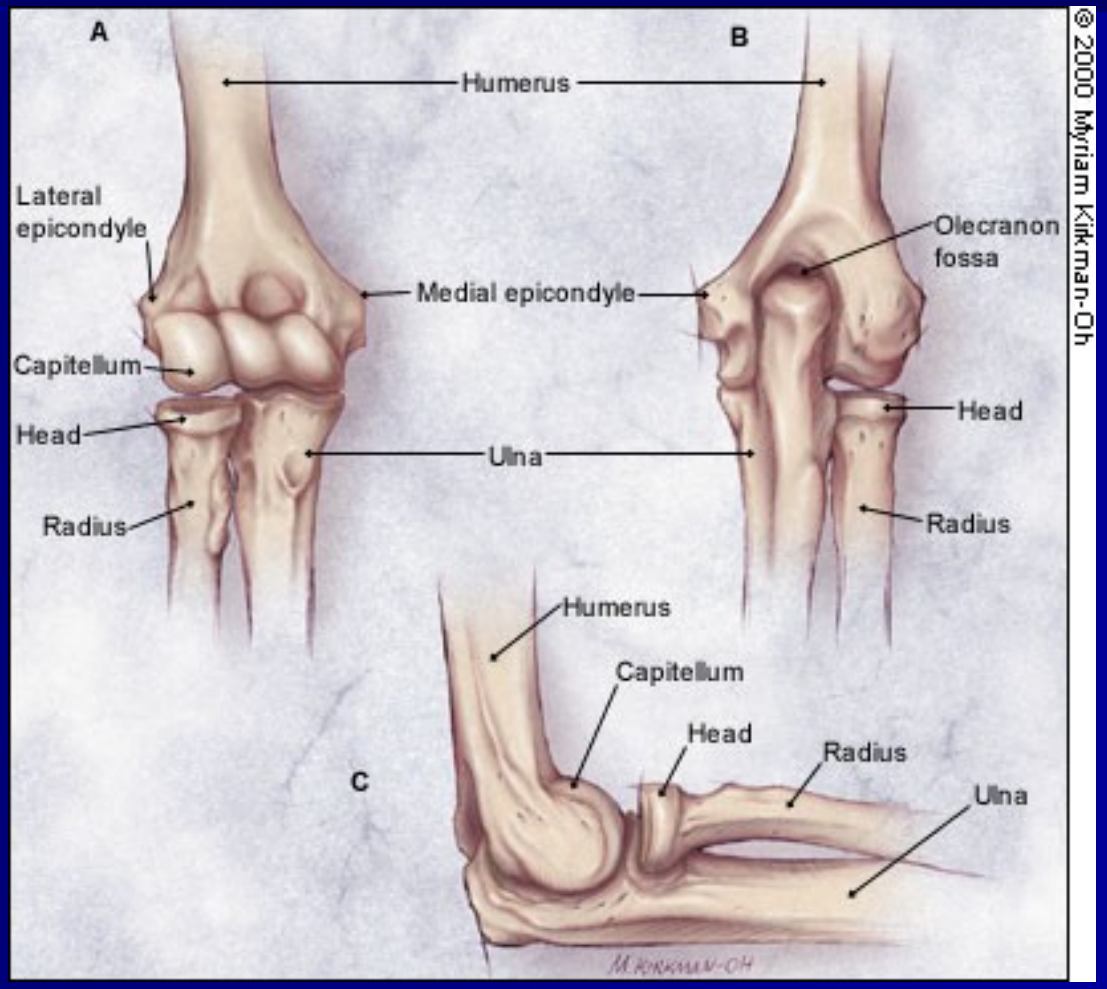


Labral Tears

- Diagnostic: Radiograph, MRI, MR arthrogram
- Treatment:
  - Conservative management usually unsuccessful
  - Surgery:
    - Types I and III: Debridement
    - Types II and IV: Debridement and Reattachment
  - Post-Op Rehabilitation
    - Immobilize for 3 weeks
    - Progress with AROM
    - Return to full activity after 12-14 weeks

Elbow Anatomy





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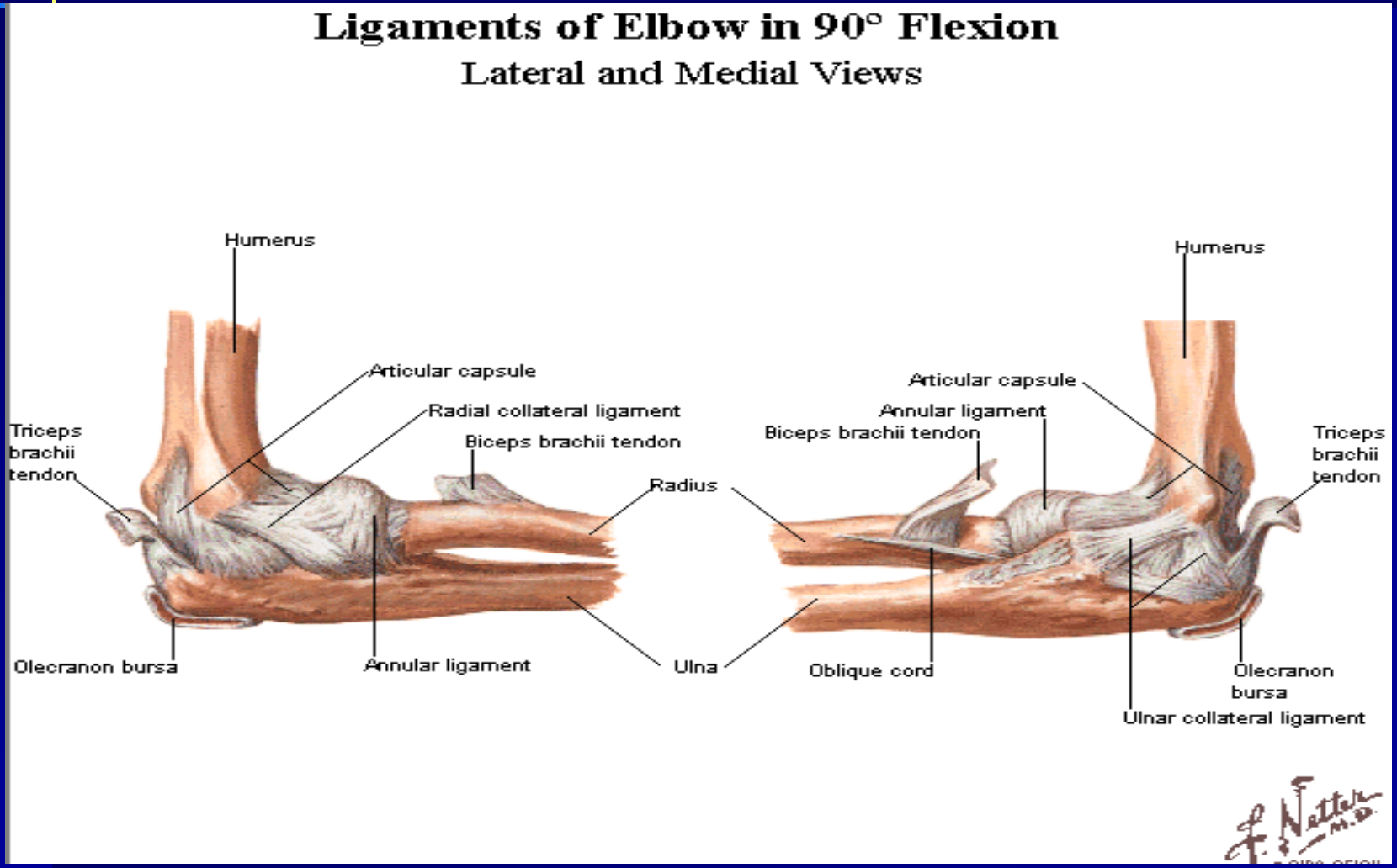

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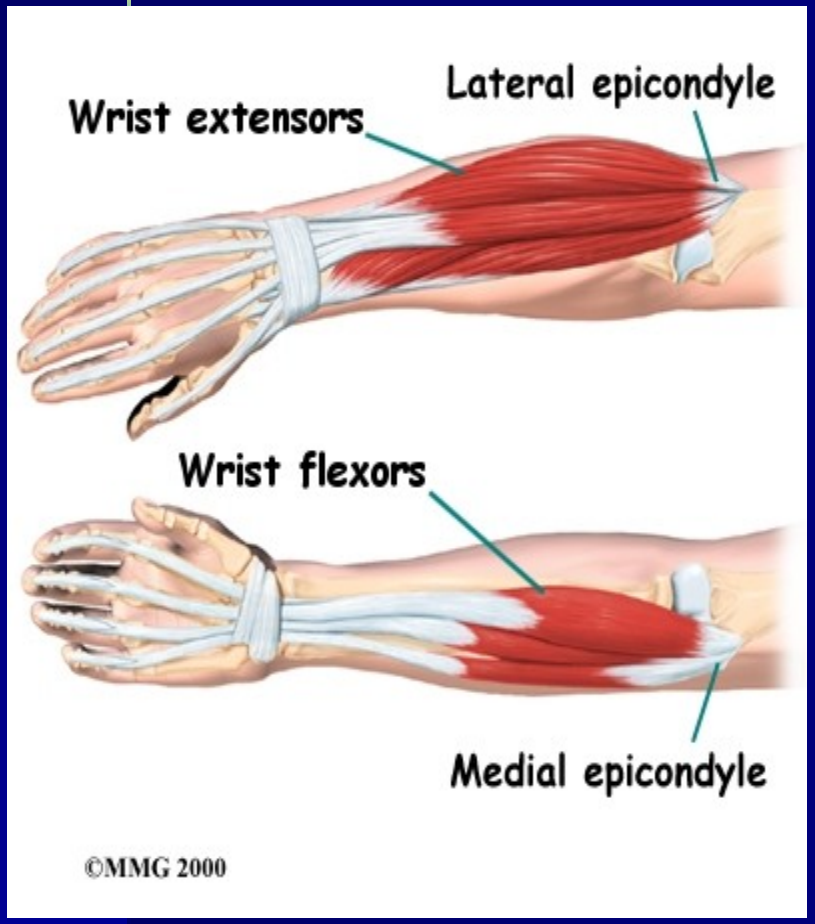
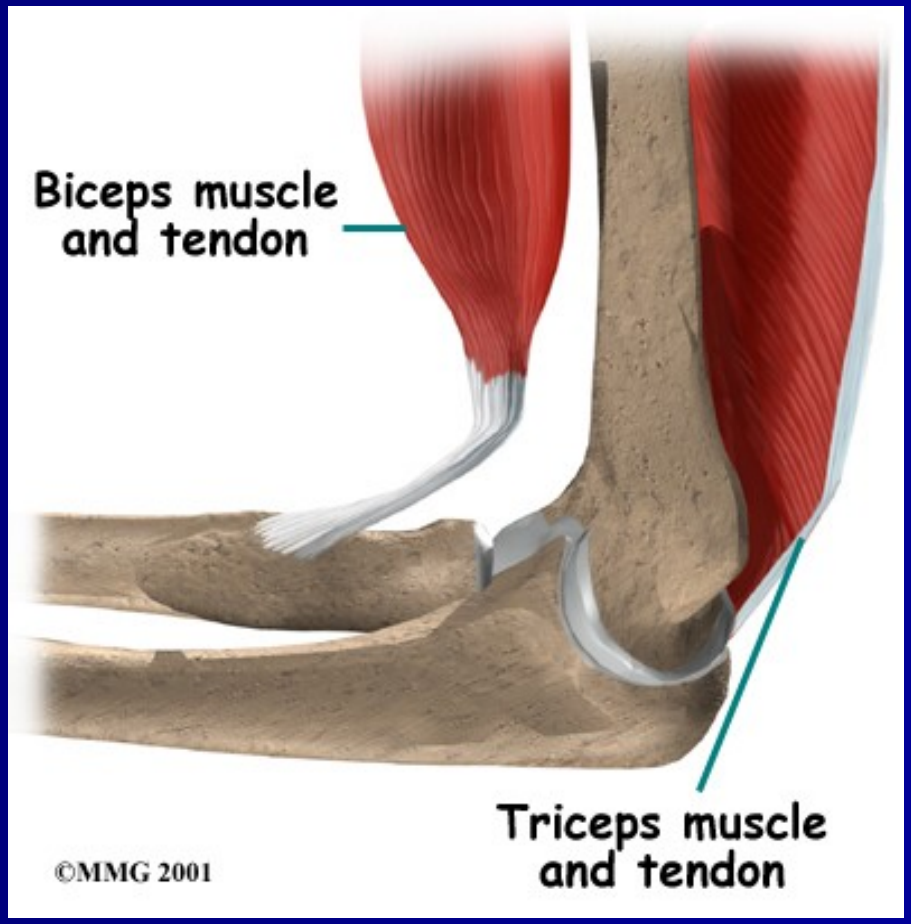




Elbow ROM

- Flexion: 140-160 degrees
- Extension: 0-10 degrees
- Pronation: 80-90 degrees
- Supination: 90 degrees

Olecranon Bursitis

- Types: Subcutaneous, Subtendinous
- Causes:
  - Repetitive Trauma
  - Friction
  - Fall
  - Infection
- History: Pain, Swelling
- Physical: Large Mass, Tenderness

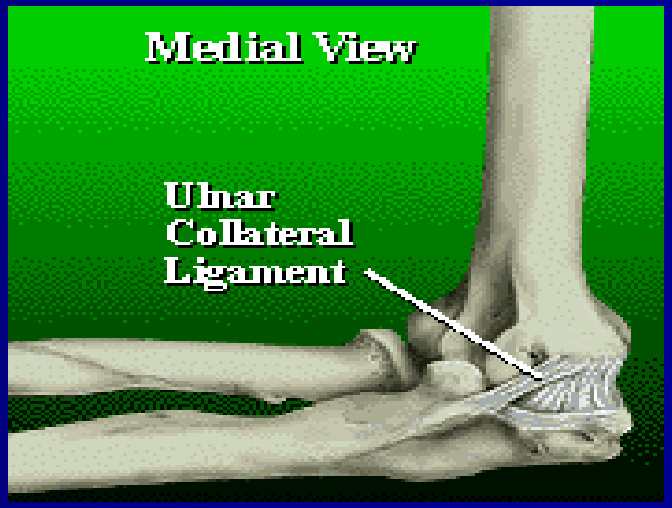
Olecranon Bursitis

- Diagnosis:
  - Labs
  - Plain Film
  - MRI
  - Joint Aspiration
- Treatment:
  - RICE
  - Elbow pad
  - Avoid hyperflexion/trauma
  - NSAIDS
  - Joint aspiration
  - Glucocorticoid Injection
    - Can speed up recovery time[3]

3. Weinstein PS, Canoso JJ, Wohlgethan JR. Long-term follow-up of corticosteroid injection for traumatic olecranon bursitis. *Ann Rheum Dis*. Feb 1984;43(1):44-6.

Ulnar Collateral Ligament Tear

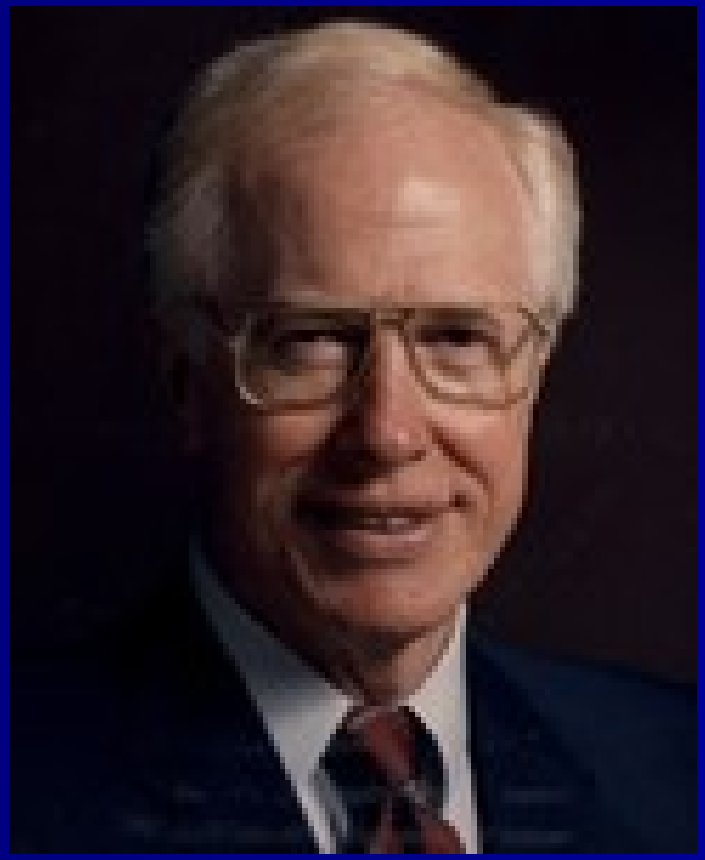
- Repetitive throwing motions, Valgus stress
- History: Gradual medial elbow pain, Sudden “pop” with medial pain, long-term “abuse” to arm
- Physical: TTP over UCL, swelling, pain with valgus stress
- Diagnosis: Radiographs, MRI with contrast, Arthroscopy



Ulnar Collateral Ligament Tear

- Treatment:
  - Rest for 3-6 months
  - Ice, NSAIDs
  - PT for ROM, stretching/strengthening
  - Very gradual return to activity

Ulnar Collateral Ligament Tear



Ulnar Collateral Ligament Tear

- "Tommy John" Surgery
  - Palmaris Longus Tendon graft
  - Woven through holes in medial epicondyle and ulna

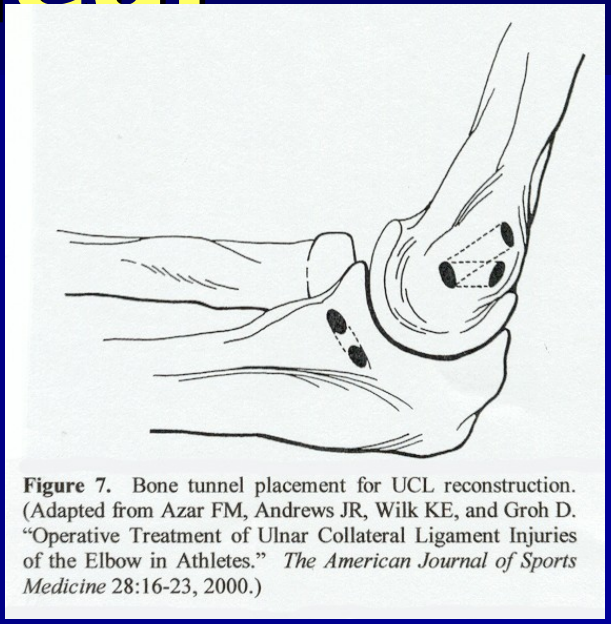
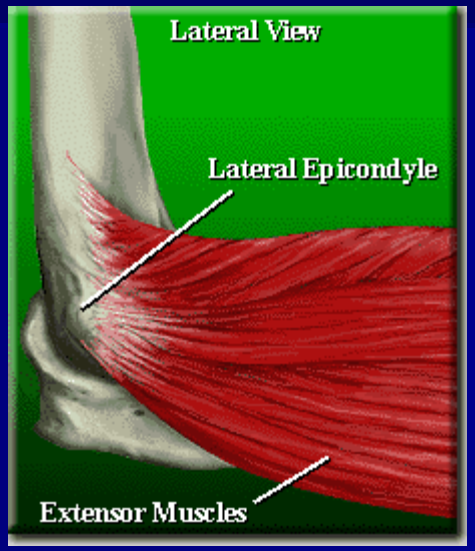


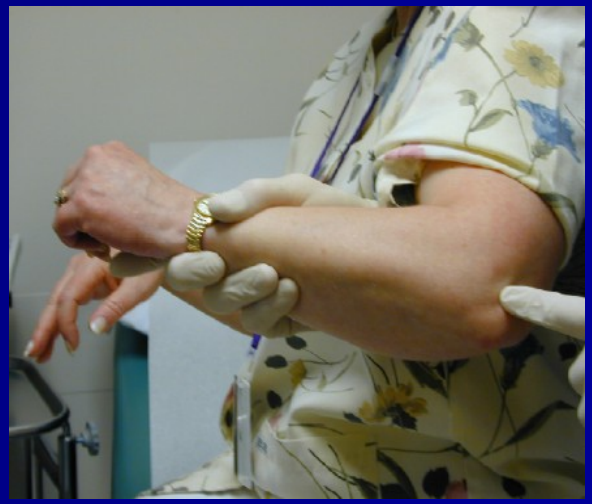
Figure 7. Bone tunnel placement for UCL reconstruction. (Adapted from Azar FM, Andrews JR, Wilk KE, and Groh D. "Operative Treatment of Ulnar Collateral Ligament Injuries of the Elbow in Athletes." *The American Journal of Sports Medicine* 28:16-23, 2000.)

- Rehabilitation
  - Immobilization for 10 days
  - Isometric strengthening after 1 month
  - Limited progressive strengthening at 2 months
  - Avoid valgus stress for 4-6 months
  - Begin throwing program after 6 months
  - Return to competitive play between 12-18 months

Lateral Epicondylitis

- “Tennis Elbow”
- Inflammation at the origin of the forearm extensors
- Risk factors: Overuse, Improper technique or equipment, Weak shoulder muscles
- History: Ages 35-60, Pain over lateral elbow, “Coffee cup” sign
- Physical: TTP; Pain with resisted wrist extension, supination





Lateral Epicondylitis

- Diagnostic: Radiographs, MRI, Anesthetic Injection
- Treatment:
  - Acute: Reduce pain/inflammation, Improve ROM
  - Wrist Orthosis
  - Counterforce brace
  - Corticosteroid Injection
  - Rehab: Grip exercises, Isometric exercises
  - Surgery

Medial Epicondylitis

- “Golfer’s Elbow”
- Causes: Overuse, Valgus Stress, Improper technique/equipment
- History: Pain over anterior medial elbow, Weakness in forearm/hand
- Physical: Pain with resisted wrist flexion and forearm pronation, tenderness to palpation

Medial Epicondylitis

- Diagnosis: Physical Exam, Plain films
- Treatment:
  - PT/OT
  - Activity Modification
  - RICE
  - Analgesics
  - Orthosis
  - Corticosteroid Injection
  - Surgery

QUESTIONS??

REFERENCES

- Auwojtys EM; Nelson G. Conservative treatment of Grade III acromioclavicular dislocations. SOClin Orthop Relat Res. 1991 Jul;(268):112-9.
- Braddom RL, et al. Physical Medicine and Rehabilitation Third Edition. Saunders Elsevier, New York, 2006
- DeLisa J, et al. Physical Medicine and Rehabilitation: Principles and Practice, Fourth Edition. Lippincott, Philadelphia, 2005
- Griffin, Letha. Essentials of Musculoskeletal Care Third Edition. AAOS, Illinois, 2005.
- Hoppenfeld, Stanley. Physical Examination of the Spine & Extremities, Prentice Hall, New Jersey, 1976

REFERENCES

- Malanga, Gerard A, Nadler, Scott F. Musculoskeletal Physical Examination: An Evidence-Based Approach. Elsevier, Philadelphia, 2006 Moore, Keith, Dalley, Arthur. Clinically Oriented Anatomy Fourth Edition. Lippincott, Philadelphia, 1999.
- Nicholas, James, Hershmann, Elliott. The Upper Extremity in Sports Medicine Second Edition. Mosby, St. Louis, 1995.
- Taft TN, et al. Dislocation of the acromioclavicular joint. An end-result study. J Bone Joint Surg Am 1987 Sep;69(7):1045-51.
- Weinstein PS, Canoso JJ, Wohlgethan JR. Long-term follow-up of corticosteroid injection for traumatic olecranon bursitis. *Ann Rheum Dis*. Feb 1984;43(1):44-6.

Shoulder Anatomy: Bursae